

FIGURE 3 - GV RANCH PHASING PLAN
MOHAVE COUNTY, ARIZONA

TABLE 1
MOHAVE COUNTY AND GV RANCH
POPULATION PROJECTIONS

Year	Mohave County POPTAC Pop. Projections Per Approved 208 Plan	Average Pop. Increase % Per Year	Arizona Department of Economic Security Pop. Projections	Average Pop. Increase % Per Year	GV Ranch	GV Ranch Pop. as % of Projected Mohave County Pop. Increase	GV Ranch Pop. As % of Projected ADES Pop. Increase
2003	162,029	N/A	N/A	N/A	N/A	N/A	N/A
2004	166,774	2.9	N/A	N/A	N/A	N/A	N/A
2005	171,504	2.8	194,920	N/A	N/A	N/A	N/A
2010	194,403	2.7	221,443	2.4	6,600	28.8	24.9
2015	215,988	2.2	252,706	2.5	13,300	31.0	21.4
2020	236,396	1.9	281,668	2.1	19,900	32.3	22.8
2025	254,952	1.6	307,703	1.7	26,500	35.6	25.4
2030	270,785	1.2	330,581	1.4	33,200	42.3	29.3
2035	283,888	1.0	350,412	1.1	39,800	50.4	33.3
2040	295,045	0.8	367,952	1.0	46,500	60.1	38.2
2045	305,643	0.7	384,331	0.9	53,100	62.3	40.3
2050	316,959	0.7	400,695	0.8	59,700	58.3	40.3

The two columns at the far right of the table are intended to demonstrate that the GV Ranch population projections are more aggressive than the Mohave County 208 Plan's projections or the ADES projections, and should be used when determining the scheduling for GV Ranch wastewater infrastructure. By way of example, in the period from 2030 to 2035, the Mohave County projection indicates that Mohave County's population will increase by 13,103 people. The GV Ranch population projection indicates that approximately 6,700 people will move into GV Ranch in that same time period. This equates to GV Ranch accounting for 50.4% of the total growth of Mohave County during this 5 year period. Considering continued growth in Kingman, the cities of the Colorado River, and the corridor between Las Vegas and Kingman, it is clear that the GV Ranch projections are the conservative choice when considering sewage infrastructure scheduling.

It is noted that the ADES population projections are provided for informational purposes only. The 208 Plan checklist recognizes only POPTAC or COG-approved estimates, which are provided in the "Mohave County POPTAC Projections Per Approved 208 Plan" column. Comparison of GV Ranch to ADES projections does provide further evidence, however, that use of the GV Ranch projections is appropriate for this 208 Plan Amendment.

GV Ranch Wastewater Flow Projections

Using the GV Ranch population projections described above in conjunction with sewage generation and peaking rates as defined in the Arizona Administrative Code (AAC), Rhodes has calculated the sewage generation rates for the development. In addition, wastewater generation rates for the interim plant and the permanent plant have been calculated separately. This is due to the differing development characteristics between

the housing inventory feeding the interim plant and the overall housing inventory of the development. These wastewater generation rates and flow estimates are shown in Tables 2, 3 and 4, respectively.

**TABLE 2
WASTEWATER GENERATION RATE ASSUMPTIONS
FOR INTERIM WWTP**

Dwelling Units		600 units – ½ active adult, ½ single family 650 apartment units
Average Wastewater Flow		80 gpcd, per ACC R18-9-B202(A)(9)(a)
Average Persons per Dwelling Unit	Active Adult	1.8 persons
	Single Family Residential	3.0 persons
	Apartment	1.5 persons
	Average Density	1.93 persons
Flow Peaking Factors	Peak Hour	2.2 per AAC R18-9-E301
	Maximum Day	2.0
	Maximum Month	1.2
Total Maximum Month Influent		193,000 gpd
Average Daily Flow		232,000 gpd
Design Capacity		240,000 gpd
Projected Buildout Period		12 months @ 50 homes/mo., and full occupancy of apts.

A key factor in generating the flow numbers for the interim WWTP is the Rhodes vision of providing housing for the workforce. A 650 unit apartment complex is being constructed for this purpose. It is anticipated that many of these apartment units will house only one person per unit. This concept will draw single workers to live at the site; as such, this has the effect of lowering the average apartment occupancy rate. Rhodes has assumed a 1.5 average occupancy rate per apartment.

**TABLE 3
WASTEWATER GENERATION RATE ASSUMPTIONS
FOR PERMANENT WWTP**

Dwelling Units		12,200 active adult/RV Park 8,200 low & medium single family residential 12,800 high single family residential Over 200 commercial acres* 1 school
Average Wastewater Flow		100 gpcd
Average Persons per Dwelling Unit	Active Adult	1.8 persons
	Single Family Residential - Low and medium	3.0 persons
	Single Family Residential - High	2.1 persons
Non-Residential Flow Characteristics	Commercial/Office	800 gpd/acre
	School	800 gpd/acre
Flow Peaking Factors	Peak Hour	2.2 per AAC R18-9-E301
	Maximum Day	2.0
	Maximum Month	1.2
Average Daily Flow		7,630,000 gallons per day
Total Maximum Month Influent		9,150,000 gallons per day
City of Kingman Flows		Up to 250,000 gpd
Design Capacity		9,400,000 gallons per day

*includes home manufacturing center

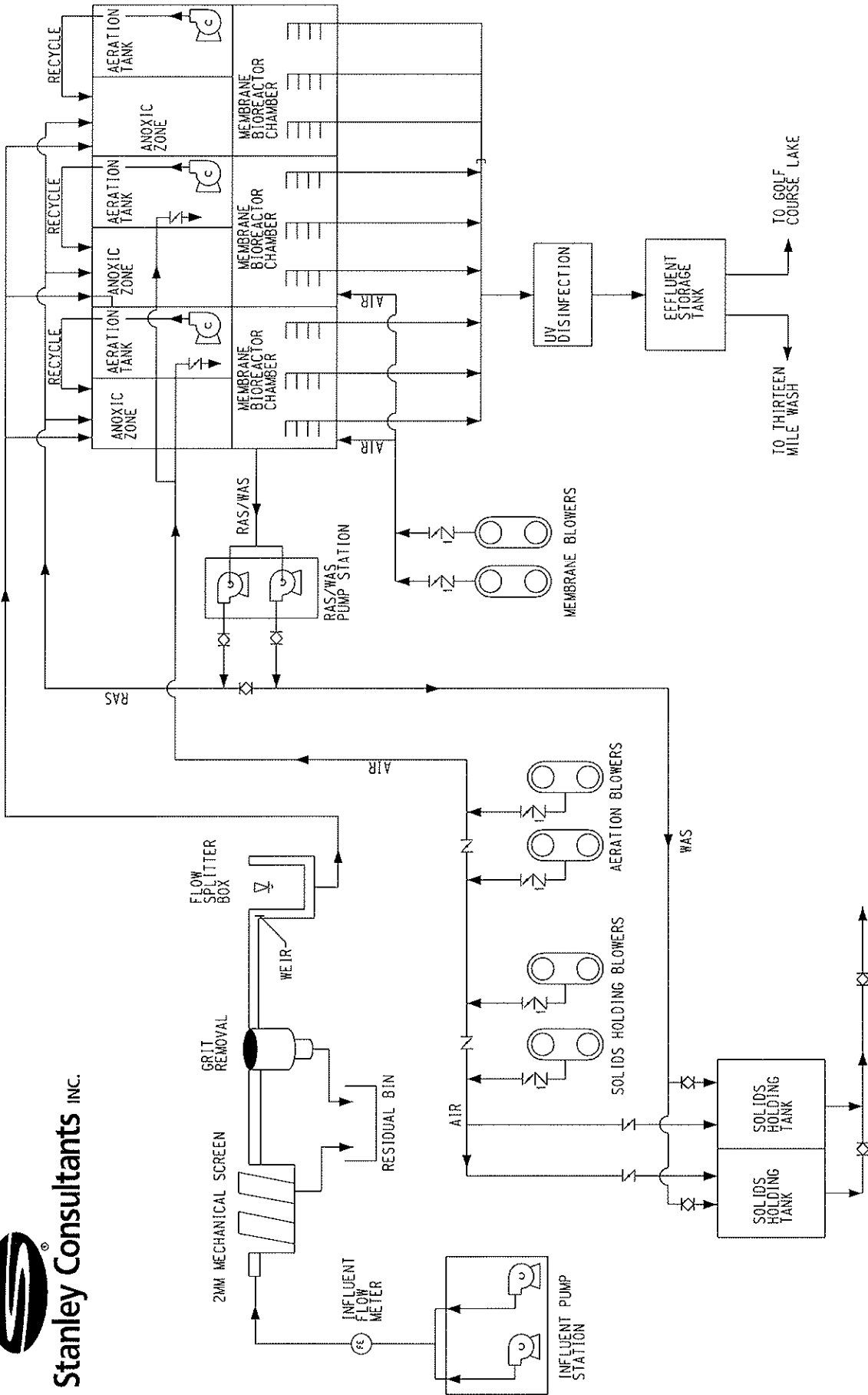
**TABLE 4
GV RANCH WASTEWATER FLOW PROJECTIONS**

Year	Flow
2005	0
2010	1,110,000
2015	1,930,000
2020	2,750,000
2025	3,570,000
2030	4,400,000
2035	5,200,000
2040	6,030,000
2045	6,880,000
2050	7,670,000
2055	8,500,000
2061	9,400,000

Wastewater Treatment Plant Description

GV Ranch will have two WWTPs constructed as a part of the development plan. The first WWTP will be an interim facility, designed to serve the first sub-phase of GV Ranch Phase 1. The second WWTP will be a permanent facility, designed to serve the full capacity of GV Ranch. The WWTPs are described below.

Interim WWTP. The interim WWTP will consist of the following process elements, as described below and as shown schematically in Figure 4, "Interim WWTP Process Schematic":



INTERIM WWTP
PROCESS SCHEMATIC

FIGURE 4

1. Influent pump station, with upstream barscreen protection against construction and other large debris.
2. Influent flow meter.
3. Fine screen to remove most particulates that can have negative impact on the biological process system.
4. Grit removal system to provide further protection to the treatment system.
5. Membrane bioreactor tertiary treatment system.
6. UV disinfection.
7. Effluent storage and pump station, with overflow discharge to tributary of Thirteen Mile Wash.
8. A transfer station to move waste solids from the WWTP to a tanker truck for landfill disposal.

The capacity of the interim WWTP will be 240,000 gpd, with the entire WWTP being constructed in one phase. A facility site plan is provided as Figure 5, "Interim WWTP Site Plan". The site will be owned by Rhodes until completion of construction. When construction is completed, the site will be turned over to the PMUC. Rhodes will retain ownership of the golf course.

The WWTP will be designed to provide Class A+ effluent as defined by AAC Title 18, Chapter 9, Article 3, and to meet all AZPDES discharge permit requirements. The effluent will be used to water the golf course, with any excess effluent being discharged via an overflow pipe in the effluent storage tank and routed to a tributary of Thirteen Mile Wash. Interim WWTP discharge locations are shown in Figure 6, "Interim WWTP Reuse Discharge Location Plan" and Figure 7, "Interim WWTP Overflow Discharge Location Plan".

Only one process train will be used until flows dictate that multiple trains can be operated in parallel and achieve a consistent Class A+ effluent. An additional food source will be available at startup, in the event that the flows are too low to sustain a viable microbiological treatment colony.

There are no anticipated discharges of sewage sludge from the interim WWTP to the environment. Waste sludge from the interim WWTP will be transferred in liquid form directly from the treatment units to tanker trucks for delivery to a landfill in Mohave County. The waste sludge transfer point will be contained such that in the event of a spill during transfer, the spillage is collected and routed back to the influent lift station for return to the WWTP. This waste sludge will be tested for hazardous materials and for passage of the paint filter test, in accordance with CFR 503.

The interim WWTP will be designed to be "relocatable". The process equipment is being provided on surface-mounted "skids" that can be lifted from a flatbed truck and placed on a foundation for support during its operational life. Then, when the plant is taken out of service, the equipment skid can be lifted back onto a truck for transport to another site. The only buried elements of the WWTP are the influent pump station, electrical conduit, and some process and discharge piping. Whatever remains on-site after the plant is taken out of service will be demolished or abandoned in place in such a way that the property can be re-integrated into the surrounding park land.

